Washington State Toxics Release Inventory

Summary Report: 1995

Washington State Department of Ecology
Hazardous Waste and Toxics Reduction Program
April, 1997
Publication #97-405

Reduce Waste

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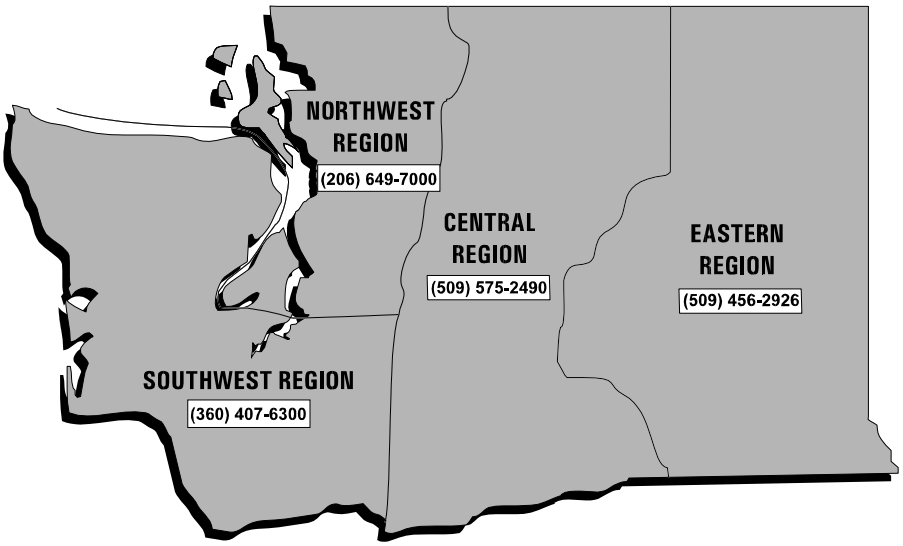

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For More Information

For additional information about the chemicals reported under the Emergency Planning and Community Right-to-Know Act (EPCRA) contact Ecology’s Hazardous Substance Information Office at 1-800-633-7585 or EPA’s EPCRA hotline at 1-800-535-0202.
More information about the Toxics Release Inventory Data is available both from Ecology and EPA at the above numbers. The national Toxics Release Inventory database is available through the National Library of Medicine, (301) 496-6531 and on the internet. Complete national and state data is also distributed to more than 1400 Governmental Printing Offices and Federal Depository Libraries. In addition, about 3000 county or municipal libraries are designated by each state librarian to hold TRI data for public use.

Executive Summary

This report summarizes the Toxics Release Inventory reports submitted to the United States Environmental Protection Agency (EPA) and to Washington State under the Emergency Planning and Community Right-to-Know Act of 1986. The reports identify total chemical releases and transfers during calendar year 1995 for over 650 chemicals or chemical categories identified by Congress as "toxic".

A chemical may be identified as "toxic" under this law if it is known to cause or can reasonably expect to cause:

- ✔ adverse human health effects;
- ✔ cancer, mutagenic or other chronic disorders; or
- ✔ serious harm to the environment

at concentrations likely to exist beyond the facility site as a result of continuous or frequent occurring releases.

- ❖ Tables in the report identify releases of chemicals to air, water and land. They also catalogue transfers of chemicals through pipes or sewers to publicly owned treatment works or other geographically or physically separate off-site treatment facilities.
- ❖ It is important to understand the following limitations when using Toxics Release Inventory information:
    - Only annual total pounds are reported. Information regarding rate of release or concentration is not included.
    - The amounts reported may be based on engineering calculations or estimates rather than direct monitoring of releases.
    - Many facilities releasing or transferring toxic chemicals are not required to submit a Toxics Release Inventory report.
    - The Toxics Release Inventory does not include toxics introduced into the environment from sources other than industrial facilities, such as pesticide applications, motor vehicles and wood stoves.
    - The toxicity of chemicals listed in the Toxics Release Inventory varies dramatically.
    - The Toxics Release Inventory does not attempt to detail the risk from individual chemicals or facilities.

The reporting of toxic releases does not necessarily mean that the chemicals released cause toxic effects. Listed Toxics Release Inventory chemicals include substances that can cause toxic effects at certain levels and under certain conditions. Local, state, and federal programs work with industry pollution prevention efforts to protect workers, communities and the environment from these listed toxic chemicals.

The Department of Ecology (Ecology) uses Toxics Release Inventory data as one environmental indicator for the state. The data also serves as a valuable tool for monitoring the progress of pollution prevention efforts in Washington.

Statewide Summary of Toxics Release Inventory Data, 1995

For 1995, 252 facilities filed Toxics Release Inventory (TRI) reports in Washington State. The releases of toxic chemicals reported for 1995 totaled 26.3 million pounds.

Releases to environmental media included:

- **AIR**, 23.8 million pounds (91 percent of total),
- **WATER**, 2.4 million pounds (9 percent of total), and
- **LAND**, 54,000 pounds (less than one-half percent).

Three industry categories contributed the largest share of chemical releases (75 percent):

- *Paper and allied products manufacturing*, 14.5 million pounds — about 55 percent of all releases;
- *Primary Metals Manufacturing*, 3.1 million pounds — 12 percent of all releases; and

- *Transportation Equipment Manufacturing,* 2.2 million pounds — 8 percent of all releases.

Fabricated metal products manufacturing and chemicals and allied products manufacturing industries were the fourth and fifth highest categories.

Federal facilities in the state accounted for a small part of total releases. Four federal facilities in Washington State reporting under President's Executive Order 12856, accounted for about 23,000 pounds.

Largest Contributors

The twenty manufacturing facilities that reported the largest quantities of Toxics Release Inventory releases accounted for over 75 percent of all chemical releases reported in the state. The four facilities with the highest amounts of releases were in the paper and allied products manufacturing sector:

Weyerhaeuser, Longview
— 5.7 million pounds
Rayonier Incorporated-
Port Angeles
— 1.6 million pounds
James River Paper Co. Inc.
— 1.5 million pounds
Boise Cascade, Wallula
— 1.3 million pounds.

Facilities Reporting Decreases

Two facilities have reduced their releases reported by over 1 million pounds each since 1988.

Boeing Commercial Airplane Group, Everett
— down 1.8 million pounds
Longview Fibre Company, Longview
— down 1.2 million pounds

Three additional facilities have reported decreases of over 800,000 pounds since 1988:

Kalama Chemical;
Boeing-Renton; and
Boeing Plant 2.

The greatest decrease in releases form 1994 to 1995 was reported by Kalama Chemical, over 100,000 pounds.

Top Chemicals

Methanol was the chemical with the highest volume of reported releases in 1995. The 8.2 million pounds of methanol reported was an increase from 1994. This was the second consecutive year of reported increases for methanol. This increase is attributed to changes in emission factors used by the pulp and paper industry. Because of the increase in methanol releases reported, the total releases for the state have increased in 1994 and 1995. When adjusted for changes in reporting requirements, state totals have decreased by 19 percent since 1988.

Ammonia, hydrochloric acid, chloroform and methyl ethyl ketone, respectively, were the second through fifth highest chemicals reported.

New Chemicals

Eleven of the 286 chemicals added to the list in 1995 were reported in Washington State. They totaled 1.2 million pounds.

Targeted Chemicals

EPA has targeted seventeen chemicals for reduction in a voluntary program, the "33/50 Program."

Participation in the program in Washington has been high. The state has achieved a 57% reduction of releases of these chemicals since 1988. This surpasses EPAs target of 50%.

Largest Releases by County

The top two counties by total release were:

- ✔ Cowlitz 6.8 million pounds; and
- ✔ King 2.2 million pounds;

Summary of Transfers

Off-site transfers to publicly owned treatment works and other off-site totaled 18.9 million pounds in 1995.

Publicly Owned Treatment Works

In 1995, manufacturers reported transferring 2.5 pounds of chemicals to publicly owned treatment works.

Other Off-Site Transfers

Other off-site transfers include quantities destined for treatment, disposal, energy recovery or recycling. About 16.4 million pounds were reported transferred off-site in 1995.

Alternate Threshold/Certification Form Reporting

Twenty-six facilities used the new two-page "certification form" to report that they had a total annual reportable amount of releases, transfers, recycling, energy recovery and treatment of 500 pounds or less. This new form was provided to ease the burden of reporting for facilities with low volumes.

Toxics Release Inventory Changes

Major changes to the chemical list in 1995 included deleting reporting for all but aerosol forms of hydrochloric acid and the addition of 286 chemicals or chemical categories. For small volume releasers, the "certification form" with simplified reporting also went into effect.

Possible future changes include a proposed rule to expand the Toxics Release Inventory to some other industry categories and proposal to require chemical use or materials accounting data reporting.

Introduction

Congress enacted the Emergency Planning and Community Right-to-Know Act into federal law on October 17, 1986. The Emergency Planning and Community Right-to-Know Act helps communities deal safely and effectively with hazardous chemicals. The law includes a number of requirements for businesses and government. It is also intended to improve emergency planning for hazardous chemicals at the local level. The Emergency Planning and Community Right-to-Know Act has a number of provisions, but its primary objectives are to:

- ✔ identify the storage, use and release of chemicals in communities;
- ✔ promote communication between facilities that handle hazardous chemicals and the local community;
- ✔ expand emergency planning for hazardous chemical incidents; and
- ✔ enhance emergency response capabilities for hazardous chemical incidents.

The Toxics Release Inventory helps meet the first two objectives.

Toxics Release Inventory

What is the Toxics Release Inventory?

The Toxics Release Inventory is the annual summary that tracks the amounts of toxic chemicals released into the air, land and water by certain manufacturing facilities. Over 650 chemical compounds and/or chemical categories listed under Section 313 of the Emergency Planning and Community Right-to-Know Act are reported under the Toxics Release Inventory. The Emergency Planning and Community Right-to-Know Act, also known as SARA Title III, came into law with the Superfund Amendments and Reauthorization Act (SARA) of 1986. These laws have required facilities to file reports annually since 1987. The Pollution Prevention Act of 1990 expanded the Toxics Release Inventory.

A chemical may be identified as "toxic" under this law if it is known to cause or can reasonably expect to cause:

- ✔ adverse human health effects;
- ✔ cancer, mutagenic or other chronic disorders; or
- ✔ serious harm to the environment

at concentrations likely to exist beyond the facility site as a result of continuous or frequent occurring releases.

Who Must Report?

Manufacturing facilities that operate under Standard Industrial Classification Codes 20-39, have 10 or more full-time employees, and meet certain activity thresholds for chemical use must comply with Toxics Release Inventory reporting requirements. Currently, thresholds for chemical use stand at 25,000 pounds for each listed chemical that is manufactured or processed, and 10,000 pounds for each listed chemical otherwise used by the facility in the reporting year (Appendix 5). Facilities submit Toxics Release Inventory information on reports known as Form R Reports. Facilities must file a separate Form R for each Toxics Release Inventory-listed chemical that they manufactured, processed, or otherwise used in their operation if the quantity exceeds threshold limits.

Federal facilities must report under Executive Order 12856 if they meet the employee and use criteria.

Facilities that had total annual reportable amounts of 500 pounds or less of releases, transfers, recycling, energy recovery and treatment of listed chemicals could use the new "certification form. Reporting year 1995 was the first year that this form, also known as the "alternate threshold" could be used. This "alternate threshold applies if a facility's use of the chemical was less than one million pounds.

When and Where is the Toxics Release Inventory report filed?

Toxics Release Inventory reports are filed every year to the EPA and the Department of Ecology. Form R reports submitted by facilities are due on July 1 for the preceding calendar year. After completing data entry and data quality checks, EPA and Ecology compile a Toxics Release Inventory database. Each agency publishes an annual summary report. EPA reports from a national perspective while Ecology focuses on Washington State.

How is Toxics Release Inventory Data Used?

Toxics Release Inventory information can be used in a variety of ways. Provided through national and state databases and publications, the Toxics Release Inventory information can help the public identify potential concerns in their communities. This data is important to the news media, as well as to those with academic or research interests. It provides an avenue for the public to work with industry to reduce hazards associated with toxic chemicals. Toxics Release Inventory data also works as a tool to help measure progress in reducing toxic chemical use and releases.

Industry can use the data to identify problem areas, establish reduction targets, reduce costs associated with the purchase and disposal of toxic chemicals, and monitor progress toward pollution prevention goals.

Federal, state and local governments can use the data to compare facilities or geographic areas, to evaluate existing environmental programs, or to target technical assistance efforts. In 1994 and 1995, Washington State used Toxics Release Inventory data to evaluate economic and social factors as they affect the environment. This study, *A Study on Environmental Equity in Washington State*, publication #95-413, was published in October 1995. The Toxics Release Inventory data is also used as one of a number of environmental indicators used in Washington State to determine the status of our efforts to reduce environmental pollution.

Congress and state legislatures have directed pollution prevention legislation toward facilities reporting under the Toxics Release Inventory. At the federal level, the Pollution Prevention Act of 1990 expanded the reporting requirements to include recycling, treatment, and energy recovery, both on and off-site. In addition, the law requires facilities to document source reduction methods.

In 1990, the Washington State Legislature passed a law establishing state policies and goals for pollution prevention. The Hazardous Waste Toxics Reduction Act encourages the reduction of hazardous substance use and hazardous waste generation. The law requires certain hazardous waste generators and hazardous substance users (defined in the law as Toxics Release Inventory reporters) to prepare plans for voluntary reduction of hazardous substance use and waste generation. Many facilities use the Toxics Release Inventory list of chemicals as a starting point for identifying source reduction opportunities.

The state pollution prevention planning requirements apply to all Toxics Release Inventory reporters and facilities that generate more than 2,640 pounds (1,000 kilograms) of hazardous waste per year. These facilities pay a hazardous waste planning fee based upon the pounds of Toxics Release Inventory chemicals released and hazardous wastes generated. Ecology uses the revenue generated from the fees to provide technical assistance to businesses. Each year, Ecology provides a summary report to state legislators describing the progress made toward pollution prevention goals. The most recent summary report, *Reducing Hazardous Wastes and Substances in Washington*, publication #97-406, covers 1995.

What are the Limitations of Toxics Release Inventory Data?

Data Issues

Facilities must file their Toxics Release Inventory Reports with both EPA and the state. In some cases, reports may be received by one agency and not the other. While every effort has been made to ensure that the databases are comparable, this may result in differences between the state and federal data.

Facilities that report under the Toxics Release Inventory may file revised Form Rs if they discover that a previously submitted form needs correction. For the 1994 and 1995 reporting years, many of these correction were filed with the state and EPA because of the changes in sulfuric acid, hydrochloric acid and ammonia reporting requirements. While Ecology has made every effort to process all forms filed, the state data may differ from EPA's because of differences in the submittals and revisions.

Under Toxics Release Inventory, facilities can report data based upon estimates and calculations rather than actual, verified pounds of toxic chemicals. Therefore, the information collected may reflect only general trends. Facilities may submit voluntary revisions of the report forms for any prior year. Sometimes the standards and methods for estimating releases change. Thus, the data is somewhat variable and can change after the report is published. However, the revisions and changes will result in a more accurate database over time.

Basing release data on estimates and calculations rather than direct measurements has raised questions about the validity of the data. A recent study at Ecology compared Toxics Release Inventory (TRI) releases reported in the state to air emissions reported to Ecology's Air Quality Program Washington Emission Data System (WEDS). State regulations give Ecology the authority to request an annual emission inventory report from any air contaminant source. In general, major sources (Appendix 6) are required by Ecology or the local air authorities to report annually. Due to the differences in reporting requirements, it was not possible to match all the facilities or chemicals in TRI with those in WEDS. About half of the pounds of chemical releases reported in TRI were also reported to the WEDS database. Since the two databases have different reporting requirements, the amount of a specific pollutant that a source reports may be different in each database. To get the most accurate information, anyone who is interested in the emissions for a specific facility should check both databases (Appendix 6).

Toxics Release Inventory Changes for 1995

1. Chemical List

Each year, the list of chemicals reportable under the Toxics Release Inventory can change reflecting additions, deletions or modifications made by EPA. Table 1 shows the changes in the Toxics Release Inventory reporting requirements over time. For 1995 reporting, EPA expanded the Toxics Release Inventory by adding 286 new chemicals and/or chemical categories to the list of reportable chemicals. Additionally, two chemicals were deleted from the list and reporting for hydrochloric acid was limited to aerosol forms.

With these changes to the list, it has become difficult to make year-to-year comparisons using the Toxics Release Inventory data. The process of trying to ensure that the year-to-year comparisons do not include changes that cause inconsistencies like the hydrochloric acid change is called "normalization." In order to make such comparisons and to normal-

Table I. Changes to Toxic Release Inventory Reporting Requirements 1987 - 1996.

YEAR	INDUSTRY CATEGORIES	CHEMICALS	OTHER
1987	Manufacturing	List of 308 chemicals. Deleted: Titanium oxide	Manufacture/process threshold 75,000 lbs.
1988	Manufacturing	Deleted: C I acid blue #9, diammonium salt; CI acid blue #9, disodium salt; melamine crystal; sodium sulfate (solution)	Manufacture/process threshold 50,000 lbs.
1989	Manufacturing	Deleted: Sodium hydroxide (solution) Modified: Aluminum oxide (only fibrous forms)	Manufacture/process threshold 25,000 lbs.
1990	Manufacturing	Added: Allyl alcohol; creosote; 2,3-dichloropropene; dintirobenzene; dinitrotoluene; isosafrole; toluene diisocyante. Deleted: Terephthalic acid ; C I green 7 & 36; C I blue 15	
1991	Manufacturing	Added: 7 CFC S and halons	Pollution Prevention data elements added
1993	Manufacturing	Deleted: Barium sulfate from barium compounds., Di-N-octyl phthalate	
1994	Manufacturing, Federal Facilities	Added: 11 HCFCs and 21 chemicals and 2 chemical categories. Deleted: Acetone, copper monochloro-phthalocyanine pigment, butyl benzyl phthalate, Modified: Ammonia, Sulfuric acid, glycol ethers	
1995	Manufacturing, Federal Facilities	Added: 286 chemicals/chemical categories. Deferred addition: 41 chemicals Modified: Hydrochloric acid Deleted: DEP, DEHA	Alternate threshold
Proposed /Future	Proposed additions: metal mining, coal mining, electric utilities, commercial hazardous waste treatment, chemicals and allied products - wholesale, petroleum bulk stations-wholesale, and solvent recovery services There are many petitions for changes to the chemical list.	There are many petitions for changes to the chemical list.There have been legal challenges to the chemical list additions.	Advanced notice of rulemaking for materials accounting (chemical use)

ize the 1995 and previous years' data, it was necessary to remove from the yearly totals:

- all chemicals added since 1988;
- all chemicals deleted from the list for all years;
- and hydrochloric acid, sulfuric acid, and ammonia.

These problems of reconciling the year-to-year comparisons limit their use in this report. Where year-to-year comparisons are made, they are either for the adjusted or normalized chemicals or for a single chemical or group of chemicals.

2. /Certification Form/ Alternate Threshold

For the reporting year 1995, the "certification form" provided eligible facilities with the option of submitting a simplified two-page form instead of the nine page Form R. This form, used for the first time in 1995, applied when total annual reportable amounts (Appendix 5) are 500 pounds or less if a facility uses less than 1 million pounds of the chemical. The facility must still determine the volume of its releases and transfers of the chemical, but it is not required to report them. Chemicals reported on this certification form are not considered to be part of the Toxics Release Inventory and are listed separately in this report (Appendix 4).

The Toxics Release Inventory in Perspective

The Toxics Release Inventory is most useful when seen as one indicator of environmental performance. Toxic chemicals are generated from many sources, including manufacturing and non-manufacturing processes, agricultural chemical use, use and disposal of consumer products, transportation, indoor and outdoor burning, and other sources. The Toxics Release Inventory reporting requirements cover only one sector, manufacturing. Other businesses and organizations, as well as individual and personal usage, may also contribute substantial amounts of toxic chemicals to the environment.

A recent Department of Ecology publication looked at many indicators of environmental progress. *Washington's Environmental Health 1996*, addresses the question, "Is the health of our environment getting better, staying the same or getting worse?" The Toxics Release Inventory factored as one of those indicators. Air quality counted as another significant indicator of environmental health. Figure 1 from that report shows the sources of air pollution in Washington State. Industrial sources, including the Toxics Release Inventory, contributed 21 percent of the state's air pollutants. About 95 percent of Toxics Release Inventory releases are to the air. Major sources of air pollution are motor vehicles, outdoor burning, and wood-stoves and fire places.

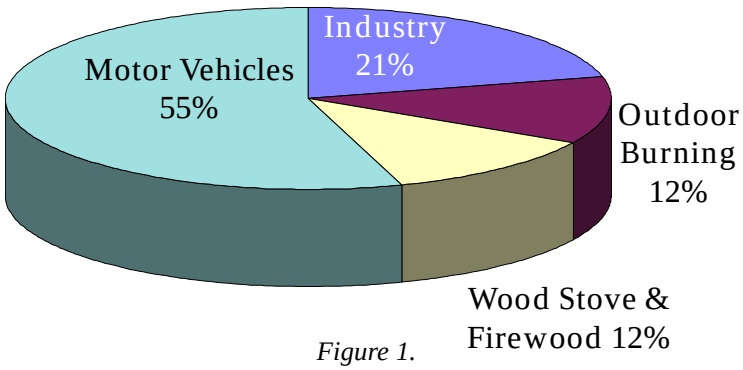


Figure 1.
Air Pollution in Washington State

It is important to realize that a release of a Toxics Release Inventory toxic chemical does not indicate a violation of federal, state or local environmental laws. Manufacturing facilities operate under state environmental regulatory permits.

Toxics Release Inventory information includes data on releases and transfers of certain chemicals. It does not indicate the rate or concentration of chemicals released, nor can it demonstrate the geographic boundaries of the chemical release. Therefore, exposures or risks to the public cannot be determined by using Toxics Release Inventory data alone.

The Environmental Protection Agency continues to develop tools that will aid communities in using the Toxics Release Inventory information in risk screening efforts. EPA is working to establish numeric relative ranking values based on reported Toxics Release Inventory releases, transfers and weighting factors. These factors represent toxicity, exposure characteristics and receptor populations based upon EPA models and databases. These risk screening and ranking efforts will help answer the complex and difficult questions of what the Toxics Release Inventory releases mean in terms of risk and exposure. In spite of these limitations, the Toxics Release Inventory data continues to be useful for addressing potential risks to a community when evaluated together with other information.

Future Developments

1. Industry Expansion

A major criticism of the Toxics Release Inventory has been that it includes only the manufacturing industries. Federal facilities were added to the list in 1993 by presidential proclamation. A proposed rule published in the Federal Register on August 28, 1996 (Volume 6, No. 168) is the result of a long study at the EPA. The rule proposed to expand the Toxics Release Inventory to include metal mining, coal mining, electric utilities, commercial hazardous waste treatment, chemicals and allied products-wholesale, petroleum bulk stations-wholesale and solvent recovery services. The EPA continues working on finalizing the rule.

The impact of this expansion will be significant. Not only will new industry types be included, but the changes in the way that the "otherwise used" threshold of 10,000 pounds is defined may alter reporting for current reporters. The proposed rules would expand this definition to include use of listed chemicals for treatment, destruction, disposal and waste stabilization.

2. Chemical Use

An Advanced Notice of Proposed Rule Making was issued on the consideration of new requirements for chemical use reporting under the community right-to-know program. "Chemical use" tracks the amount of a chemical brought into a facility, the amount incorporated into products and waste and the amount leaving the facility. In September 1996, EPA opened a 90 day comment period and held two public meetings regarding this issue. A second comment period was opened to allow further comment.

New Jersey and Massachusetts already have "chemical use" or materials accounting programs in place. The analysis of these programs has been an integral part of the proposals at EPA. They are exploring many options regarding the uses, benefits and concerns about materials accounting. Any final rule-making will have a major impact on reporting facilities. These facilities have been encouraged to participate in the rule-making process.

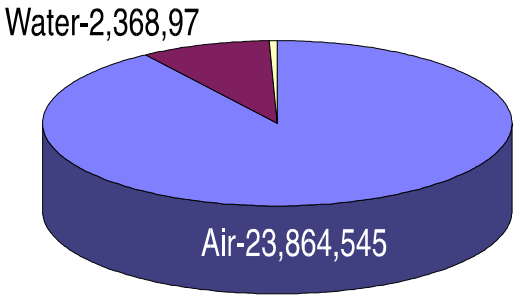
Washington State Toxics Release Inventory Findings

Toxics Release Inventory Releases by Environmental Media

As of January 1997, 252 facilities in Washington State had filed at least one Toxics Release Inventory report form (Form R) for 1995. This is 43 fewer facilities than filed in the previous year. Seventeen of these were new reporters. Additionally, 26 facilities used the "Certification Form." (Appendix 4). This form certifies that even though more than the threshold quantity of a chemical was used, the total annual reportable amount was 500 pounds or less. This alternate form is not counted as a Form R report.

Changes in reporting requirements including the modifications for sulfuric and hydrochloric acids contribute to the general decrease in the number of Toxics Release Inventory facilities.

In 1995, the facilities reported a total of 26,287,801 pounds of toxic chemicals released to air, water and land (Figure 2). Air releases comprised 90.6 percent of all releases. Water releases made up 9 percent and land releases accounted for less that one-half of one percent of releases. No underground injection releases were reported.



Toxics Release Inventory Releases by Industry Category

Of the nineteen possible primary Standard Industrial Classification categories required to report under Toxics Release Inventory, eighteen were represented in the Washington Toxics Release Inventory for 1995. Eight of the industry categories were responsible for 96 percent of the releases in the state (Figure 3). The "paper and allied products" manufacturing class reported the largest share of releases, 14.5 million pounds. This amount comprised about 55 percent of the releases reported in the state. "Primary metals manufacturing" was second with 3.1 million pounds reported (11.7 percent).

Other top classification groups included:

- ✔ "transportation equipment manufacturing," 2.2 million pounds (8.5 percent);
- ✔ "fabricated metal products," 1.7 million pounds (6.6 percent);
- ✔ "chemicals & allied products manufacturing," 1.5 million pounds (5.6 percent);
- ✔ "petroleum refining," 917,000 pounds (3.5 percent);
- ✔ "rubber & plastics manufacturing," 917,000 pounds (3.5 percent);
- ✔ "lumber and wood products," 520,000 pounds (2 percent).

All other classifications combined reported releases of about 970,000 pounds, less than four percent of the state total.

Top Reporting Facilities

In 1995, the combined releases of the twenty facilities with the largest quantities of reported toxic chemical releases were 19.7 million pounds (Table 2). This represents 75 percent of the state total. Weyerhaeuser- Longview, a pulp mill in Cowlitz county reported the highest amount of releases, 5.7 million pounds. The top four facilities, and eight of the top ten facilities, do business in the pulp and paper industry.

Facilities Reporting Decreases

Many facilities have reduced the releases reported under the Toxics Release Inventory. When adjusted for changes in reporting requirements, two facilities have decreased their reported releases by over one million pounds since 1988. Boeing Commercial Airplane Group in Everett has reduced its releases by 1.8 million pounds. Longview Fibre Company in Longview has reduced its reported releases by 1.2 million pounds. Three additional facilities reported decreases of over 800,000 pounds: Kalama Chemical, Boeing - Renton, and Seattle's Boeing Plant 2.

The facility showing the greatest reduction in releases from 1994 to 1995 was Kalama Chemical, 138,663 pounds.

Paper & Allied Products

With over 14 million pounds of reported releases, the "paper and allied products" manufacturing category accounted for about 55 percent of the releases reported in the state. Fifteen different facilities reported in this category in 1995. The amount of

Table 2
Washington TRI Top 20 Facilities, 1995 Releases to all media (in pounds)

FACTORY NAME	CITY	NONPOINT AIR	POINT AIR	TOTAL AIR	WATER	LAND	TOTAL
WEYERHAEUSER CO - LONGVIEW	LONGVIEW	261,881	4,960,189	5,222,070	483,676	0	5,705,746
RAYONIER INC - PORT ANGELES MILL	PORT ANGELES	4,000	992,577	996,577	608,900	0	1,605,477
JAMES RIVER PAPER COMPANY INC	CAMAS	468,794	900,773	1,369,567	124,844	5,465	1,499,876
BOISE CASCADE - WALLULA	WALLULA	59,000	1,093,940	1,152,940	102,811	3,945	1,259,696
UNOCAL AGRICULTURAL PRODUCTS KENNEWICK PLANT	KENNEWICK	44,106	963,596	1,007,702	5,892	22,977	1,036,571
SIMPSON TACOMA KRAFT CO	TACOMA	23,512	945,787	969,299	39,292	0	1,008,591
GEORGIA-PACIFIC WEST INC	BELLINGHAM	144,495	334,577	479,072	333,557	0	812,629
BOEING COMM AIRPLANE GRP - EVERETT	EVERETT	159,432	561,930	721,362	1,510	0	722,872
LONGVIEW FIBRE COMPANY	LONGVIEW	31,020	514,000	545,020	114,005	0	659,025
WEYERHAEUSER CO - COSMOPOLIS	COSMOPOLIS	760	636,700	637,460	18,000	0	655,460
PORT TOWNSEND PAPER CORP	PORT TOWNSEND	6,970	607,600	614,570	5,812	0	620,382
WENATCHEE WORKS ALUMINUM CO	MALAGA	75,111	505,863	580,974	0	0	580,974
KIMBERLY-CLARK CORPORATION	EVERETT	83,474	91,420	174,894	388,300	0	563,194
VANALCO INC	VANCOUVER	10	501,450	501,460	5	0	501,465
KAISER MEAD WORKS	MEAD	390,500	87,500	478,000	250	250	478,500
KAISER ALUMINUM - TRENTWOOD	SPOKANE	28,773	432,096	460,869	26	0	460,895
CROWN BEVERAGE PACKAGING PLANT #076	OLYMPIA	109,230	327,691	436,921	0	0	436,921
CRAIN INDUSTRIES-KENT DIVISION	KENT	0	386,082	386,082	0	0	386,082
INTALCO ALUMINUM CORPORATION	FERNDALE	5	385,413	385,418	0	0	385,418
CROWN BEVERAGE PACKAGING	WALLA WALLA	50,676	324,381	375,057	0	0	375,057

Transportation Equipment Manufacturing

The "transportation equipment manufacturing" industry reported releases of 2.2 million pounds. There were 32 facilities reporting in this category. The nine Boeing facilities reported 0.9 million pounds in 1995. Boeing has reduced its reported releases from a high of 5.4 million pounds in 1990. This industry, which includes aircraft manufacturing, has continued to reduce the amount of releases reported under Toxics Release Inventory.

"Transportation equipment manufacturing," including the facilities that reported under the Toxics Release Inventory, employed about 79,600 people in the state of Washington in 1995.

Fabricated Metal Products

The "fabricated metal products manufacturing" industry was the fourth highest industry reporting releases under Toxics Release Inventory. Releases from the 33 facilities reporting in this industry were 1.7 million pounds. Releases in fabricated metals manufacturing decreased from their 1994 total. Major chemicals reported by this industry were glycol ethers and n-butyl alcohol.

"Fabricated metal products manufacturing" industry, including the facilities that reported under the Toxics Release Inventory employed about 13,200 people in the state of Washington in 1995.

Federal Facilities

Federal facilities reported in 1995 for the second year under Executive Order 12856. Four facilities reported in Washington State: US Department of Energy - Hanford Site, Bangor Naval Submarine Base, Puget Sound Naval Shipyard and I Corp./Fort Lewis. These four facilities reported releases of 23,455 pounds in 1995, a small part of the state total.

Toxics Release Inventory Releases by Chemical

Reporting year 1995 was the first year the expanded list of chemicals were included in the Toxics Release Inventory. In a single year, the number of reportable chemicals increased from 350 to over 600. Of this list of 650 chemicals, 102 different chemicals were reported by one or more facilities in Washington State (Appendix 1). Eleven of these are on the list of newly added chemicals. The top ten chemicals represent 75 percent of all chemical releases reported in the state. The top 5 chemicals reported were methanol, ammonia, hydrochloric acid, chloroform and methyl ethyl ketone.

Methanol

Methanol is generated through chemical reactions and occurs naturally in the breakdown of wood fibers. The pulping process releases this chemical from the wood fibers. Methanol is a flammable solvent and is the most reported chemical for 1995. Methanol releases in 1995 were 8.2 million pounds, an increase from 6.6 million pounds in 1994 and 4.0 million pounds in 1993.

Table 3 compares methanol releases reported over time. The primary reporters of methanol operate in the paper and allied products industry category. The picture of what has happened with methanol release reporting since 1990 represents an example of how it is difficult to make year- to-year comparisons with Toxics Release Inventory data. Some of industry uses emission factors provided by the National Council for Air and Stream Improvement to calculate releases. In 1994, new emission factors were provided to the industry. The new emission factors for 1994 resulted in the reporting of an increase in the amount of methanol released by manufacturers.

Ideally, a facility should go back and recalculate their reported releases for previous years when new factors cause major changes in reporting. Historically, Toxics Release Inventory databases have

Table 3
Methanol Releases in Washington, 1988 -1995 (in pounds)

FACILITY	88	89	90	91	92	93	94	95	change 88-95
WEYERHAEUSER CO - LONGVIEW	335,000	362,000	395,000	558,000	489,800	447,000	2,146,943	3,803,098	1035.25%
RAYONIER INC - PORT ANGELES MILL	32,981	454,250	337,000	382,500	708,260	578,500	721,000	835,923	2434.56%
JAMES RIVER PAPER COMPANY INC	136,750	196,100	225,905	26,705	34,405	22,205	788,000	732,700	435.80%
SIMPSON TACOMA KRAFT CO	313,601	329,367	349,309	386,469	483,620	439,143	757,000	697,000	122.26%
WEYERHAEUSER CO - COSMOPOLIS	12,850	26,500	137,100	240,950	263,400	633,100	550,500	552,250	4197.67%
BOISE CASCADE - WALLULA	257,250	244,250	251,255	350,605	439,019	366,453	602,711	548,900	113.37%
LONGVIEW FIBRE COMPANY	1,100,250	130,250	120,250	270,250	990,000	798,000	442,000	401,000	-63.55%
GEORGIA-PACIFIC WEST INC	170,160	170,160	170,160	170,420	170,760	170,960	170,730	170,241	0.05%
KIMBERLY-CLARK CORPORATION	74,000	74,000	72,000	76,000	159,000	57,000	93,000	145,000	95.95%
PORT TOWNSEND PAPER CORP	90,000	90,000	83,160	85,800	405,170	157,210	157,400	142,400	58.22%
TOTAL - ALL FACILITIES	3,305,710	2,707,631	2,596,803	3,150,489	4,574,964	3,903,161	6,636,561	8,218,871	148.63%

not been adjusted for these changes. For example, acetone was deleted from the list of reportable chemicals in 1994, but acetone releases are still included in data for 1993 and before. When comparing 1994 data to 1993 and prior years, the releases due to acetone should be excluded from totals. For methanol, where the reporting requirements for the chemical have remained constant but the way some releases are calculated has changed, how to make the year-to-year comparisons is not as clear.

Ammonia

Ammonia was the number two reported chemical in 1995. Reported releases of ammonia totaled 2.3 million pounds. In 1994, ammonia releases totaled 2.4 million pounds. Ammonia is used in the manufacture of nitrogen compounds including chemicals used in fertilizer and in making nylon and plastics. It is also used in refrigeration and pulp and paper production. EPA added a qualifier to reporting of ammonia under Toxics Release Inventory in 1994. The qualifier for ammonia means that anhydrous forms of ammonia are 100 percent reportable; but solutions of ammonia and water are limited to 10 percent of total aqueous ammonia. In past years, aqueous forms of ammonia were 100 percent reportable. For this reason, reported releases for past years (when ammonia was the number 1 reportable chemical in the state) are not comparable to the 1994 or 1995 values.

Ammonia was reported by 40 facilities in 1995. Unocal Agricultural Products, Kennewick, reported about one million pounds of ammonia releases to the environment, almost one-half of the state total. Other facilities reporting over

100,000 pounds of ammonia releases were Rayonier, Inc. - Port Angeles Mill, Weyerhaeuser Co. - Longview, and Northwest Alloys in Addy.

Hydrochloric Acid

Hydrochloric acid is the third on the list of most released Toxics Release Inventory chemicals in Washington State in 1995. Many manufacturing operations use hydrochloric acid. Some plants in the pulp and paper industry emit hydrochloric acid produced during combustion of wood wastes. The wood waste contains salt from storing logs in water. Reporting of hydrochloric acid was modified by EPA for the 1995 reporting year. The qualifier for hydrochloric acid means that the only forms of this chemical that are reportable are aerosols. Acid aerosols include mists, vapors, gas, and other airborne forms of any particle size. While all facilities that had reported for this acid in 1994 were notified of the change by EPA and the state, it is possible that some facilities still reported for non-aerosol forms. This change invalidates any comparison of 1995 data to prior years'.

Twenty-five facilities reported for hydrochloric acid in 1995. Of the eight facilities reporting the most releases of this chemical, seven were in the "paper and allied products manufacturing" industry category. Boise Cascade - Wallula reported 486,000 pounds of hydrochloric acid released to the air. Kaiser Aluminum in Trentwood reported 232,000 pounds of releases.

Chloroform

Chloroform is the fourth highest reported chemical in 1995. Chloroform releases increased from 1.0 million pounds in 1994 to 1.4 million pounds in 1995. All seven facilities reporting chloroform releases were in the "paper and allied products manufacturing" industry category. James River Paper Company in Camas was the facility reporting the greatest amount of chloroform, 476,000 pounds. Weyerhaeuser Co. - Longview was second, reporting 285,000 pounds of which 100, 948 pounds were reported released to water.

Overall, chloroform releases have decreased from a high of 2.7 million pounds in 1989. Chloroform is a carcinogen and one of the 33/50 Program chemicals targeted for reduction in the voluntary program sponsored by EPA.

Releases of all carcinogens[1] in Washington State were 7.1 million pounds in 1988. They decreased to 3.7 million pounds in 1994 and then increased to 4.4 million pounds in 1995. Releases of chloroform and acetaldehyde by the "paper and allied products manufacturing" industry account for the carcinogen increase from 1994 to 1995.

Methyl Ethyl Ketone

Methyl ethyl ketone was the fifth most reported chemical in 1995. Methyl ethyl ketone releases decreased in 1995 for the 6th year. This chemical is one of the 33/50 Program chemicals targeted for reduction by EPA (see below). In 1988, 2.2 million pounds were reported released. In 1995, 1.2 million pounds were reported, a 43 percent decrease. Methyl ethyl ketone is a widely used solvent. It is flammable and may be harmful if inhaled.

New Chemicals

Of the 286 new chemicals or chemical categories, eleven were reported in Washington State in 1995. Many of the added chemicals are active ingredient pesticides. Almost 1.2 million pounds of the newly-listed chemicals were reported released to the air, land and water in 1995. The chemical with the highest amount of releases was the "nitrate compounds" category with 778,000 pounds. The nitrate

Toxics Release Inventory Releases by County

compounds category included only compounds that dissolve in water solution and they are reportable only when present in a solution. The second-highest reported chemical was n-hexane, 357,000 pounds .

33/50 Program Chemical

The EPA targeted 17 priority pollutants for reduction in releases and transfers through a voluntary program called the 33/50 Program. This pollution prevention initiative called for a 33 percent reduction in releases of these chemicals by 1992 and a 50 percent reduction by 1995 based upon 1988 values. The EPA chose these chemicals because they pose concerns for public health and the environment and were high-volume industrial chemicals that could be reduced through pollution prevention efforts. This successful voluntary partnership between government and industry has established a model for voluntary programs at EPA and elsewhere.

Washington State had one of the highest rates in the nation of businesses volunteering to participate in this program. Fifty-five Washington facilities participated in the program. Table 4 compares the state's releases of 33/50 program chemicals from 1988 to 1995. The table shows that Washington State met its 33/50 program goal in 1993 and exceeded it in 1995 by reducing chemical releases by 57 percent compared to 1988. This is in contrast to the statewide total (adjusted for changes in reporting requirements) which had decreased 19 percent compared to 1988.

Still, looking at releases by area and population helps establish points of reference and gives a starting point to better characterize

Twenty-four of Washington's thirty-nine counties had facilities that reported Toxics Release Inventory releases (Figure 4). Franklin County had a reporter, but no reported releases. Reporters in Cowlitz, King, and Clark counties acknowledged releases that totaled over 2 million pounds per county. Releases reported in ten counties totaled over one million pounds per county. Fourteen counties reported totals of releases that exceeded 500,000 pounds. The releases in these fourteen counties accounted for 96.3 percent of all Toxics Release Inventory releases statewide.

Cowlitz County reported the largest amount of chemicals released in the state in 1995. The 6.8 million pounds accounted for about one-fourth of the state total. Weyerhauser, Longview accounted for 5.7 million pounds of the county's releases.

King County ranked second with 2.5 million pounds, followed by Clark County with 2.2 million pounds.

Whatcom, Spokane, Clallam, Walla Walla, Snohomish, Pierce and Benton counties all reported over 1 million pounds of releases. Thurston, Grays Harbor, Jefferson and Chelan each reported releases that totaled between 500, 000 and 1 million pounds.

The Toxics Release Inventory information is collected and analyzed according to political boundaries such as states and counties. Of course, natural earth processes cross over such artificial boundaries. Surface water movement and weather patterns affect the impact chemical releases have on the soil, water and air. The way the winds blow and waters flow will influence the impact of chemicals on the environment independent of political boundaries.

Table 4
33/50 Program Chemical Releases in Washington, (in pounds)

Chemical	Nonpoint Air	Point Air	Air	Water	Land	95 Total	88 Total	Change
1,1,1-TRICHLOROETHANE	115,963	29,203	145,166	5	0	145,171	1,305,307	-88.88%
BENZENE	60,799	62,504	123,303	263	321	123,887	463,781	-73.29%
CADMIUM COMPOUNDS	0	31	31	0	0	31	256	-87.89%
CHLOROFORM	790,493	466,338	1,256,831	134,768	0	1,391,599	2,173,554	-35.98%
CHROMIUM	779	91	870	114	0	984	25,643	-96.16%
CHROMIUM COMPOUNDS	65	1,348	1,413	20,951	2,733	25,097	20,795	20.69%
DICHLOROMETHANE	96,909	469,375	566,284	1	5	566,290	1,111,145	-49.04%
LEAD	17	266	283	0	0	283	3,833	-92.62%
LEAD COMPOUNDS	472	1,642	2,114	0	111	2,225	2,790	-20.25%
MERCURY COMPOUNDS	1,000	450	1,450	110	0	1,560	0	
METHYL ETHYL KETONE	336,508	915,003	1,251,511	1,733	0	1,253,244	2,237,218	-43.98%
METHYL ISOBUTYL KETONE	25,833	61,872	87,705	0	0	87,705	216,954	-59.57%
NICKEL	510	2	512	0	0	512	1,257	-59.27%
NICKEL COMPOUNDS	10	2,640	2,650	320	952	3,922	1,250	213.76%
TETRACHLOROETHYLENE	15,065	10	15,075	0	0	15,075	16,000	-5.78%
TOLUENE	297,636	678,438	976,074	2,053	133	978,260	2,981,827	-67.19%
TRICHLOROETHYLENE	104,719	4,545	109,264	0	0	109,264	1,279,926	-91.46%
XYLENE (MIXED ISOMERS)	314,516	680,534	995,050	22	184	995,256	1,434,458	-30.62%
						5,700,365	13,275,994	-57.06%

the impact of these release. The points of reference cannot, however, be used to directly assess exposure and environmental risk. The question of determining the risk associated with a chemical release is a complex process that falls far beyond the scope of this report. Some relative rankings of Toxics Release Inventory chemicals have been developed, but in general, to determine the risk of a particular situation requires a process called risk assessment. The EPA has developed tools to help communities deal with local environmental problems including chemical risk assessments. These tools are available by contacting EPA or on the EPA website (www.epa.gov).

Counties Ranked-Pounds per Square Mile[2]

County rankings relating Toxics Release Inventory releases per square mile appear in Figure 5. A county may rank higher on releases per area, but lower on the overall county rankings because of its relatively smaller size, even though its releases were a relatively small number.

Cowlitz County ranked first with 5,985 pounds per square mile. Cowlitz County has a small area and ranked first in the counties in releases. These two factors give it a high number for pounds per area. Clark County ranked second with 3,522 pounds per square mile. Walla Walla County was third with 1,331 pounds per square mile. King, Thurston and Spokane placed fourth, fifth and sixth respectively. Clark and Thurston counties ranked higher here than in the rankings by releases because of their relatively small areas.

Statewide releases averaged 396 pounds per square mile.

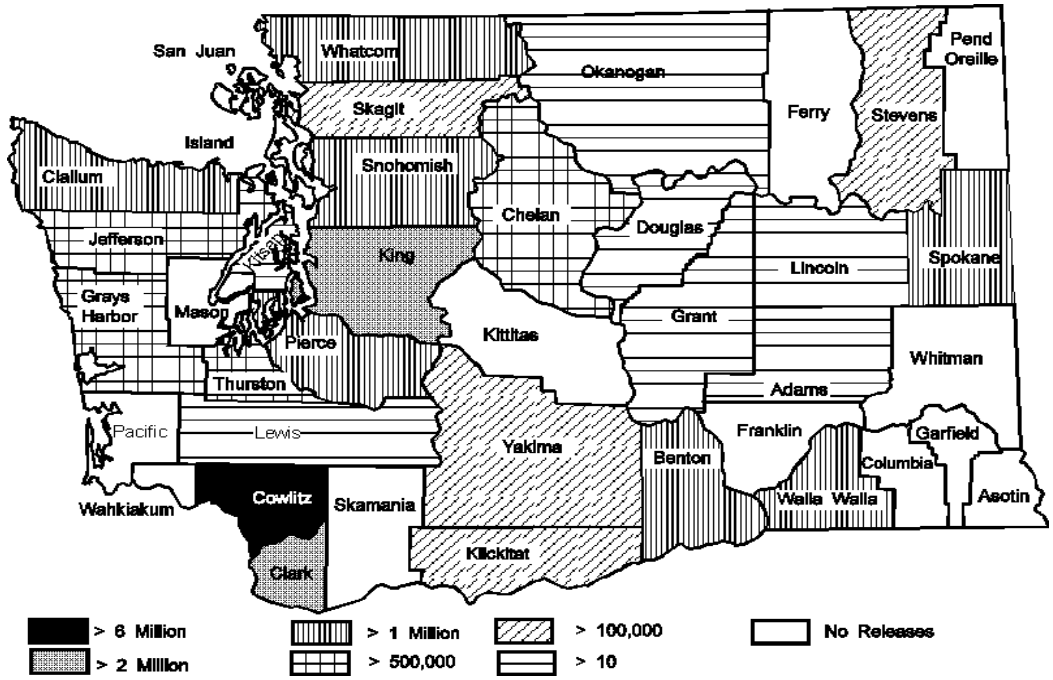
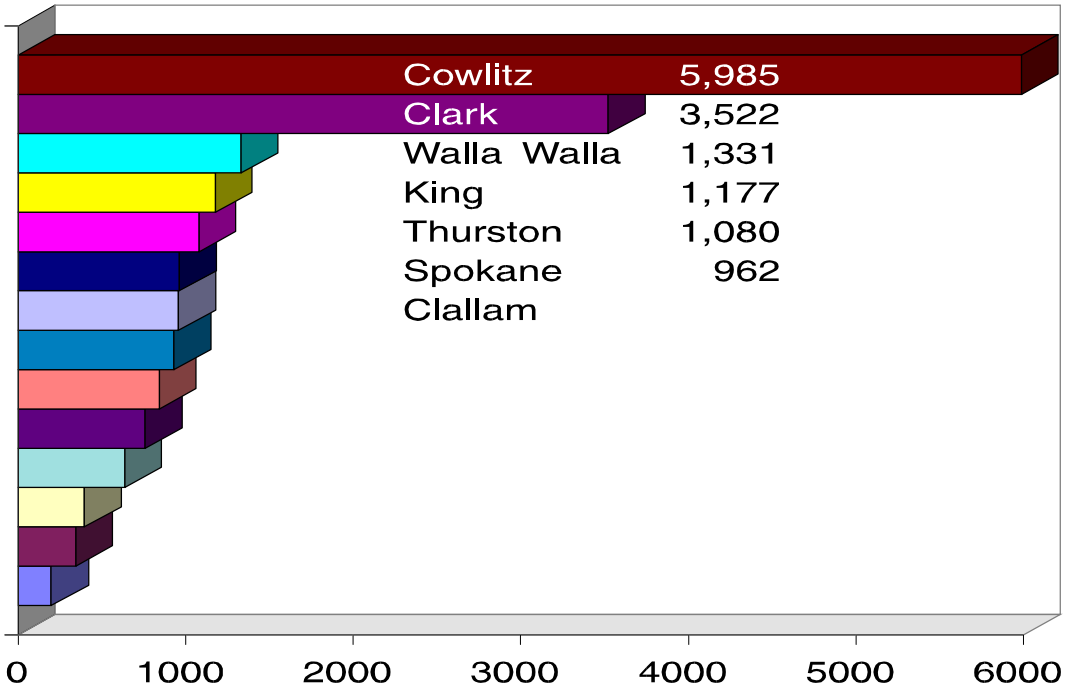


Figure 4
Washington TRI Release by County, 1995


Cowlitz 5,985
Clark 3,522
Walla Walla 1,331
King 1,177
Thurston 1,080
Spokane 962
Clallam
0
1000
2000
3000
4000
5000
6000

Counties Ranked-Pounds by Population[3]

Cowlitz County was also number one when Toxics Release Inventory releases were ranked by estimated 1995 population in pounds per person (Figure 6). Cowlitz County reported 76 pounds of chemical releases per person. Walla Walla, Clallam and Jefferson reported more than 20 pounds per person. Whatcom and Grays Harbor counties ranked fifth and sixth with 11 and 12 pounds reported respectively. Statewide, releases averaged nearly 5 pounds per person.

Counties that appear high on this list often have fairly high release amounts and average populations (Clallam and Grays Harbor Counties) or moderate releases with very small populations (Jefferson County).

Counties like King and Pierce counties, with very large populations, do not show up in the ranking of top 14 counties even though they had high releases.

Finally, when all reported chemicals are included, a dramatic decline for reporting years 1988 - 1990 is shown, with more gradual decrease since 1990.

The differences shown in Figure 7 demonstrate the difficulty of making year-to-year comparisons for Toxics Release Inventory data. Even when using normalized values, changes like the methanol data can skew the results. To be entirely accurate, perhaps we should only look at those chemicals that have been reported by particular facilities for all eight years. There are some facilities that have modified their chemical use so much that they no longer report. Excluding them from comparative totals would not give credit for reductions in those cases. Comparisons are most accurate, when addressing a particular chemical over time. At that level, the original reports will show what has happened at a particular facility.

Toxics Releases Inventory Releases: 1988 — 1995

Toxics Release Inventory releases to all environmental media increased in 1995 when compared to 1993 or 1994 amounts (adjusted for changes in reporting requirements). However, the picture of how Toxics Release Inventory releases have changed over time is dependent upon the criteria used for analysis. For example the 33/50 Program Chemicals (Table 4) have decreased by over 50 percent since 1988. When all chemicals that have had constant reporting requirements since 1988 are included, the results also show a decline, although not as dramatic as the 33/50 chemicals. When methanol is added to the total, the line for releases to all media declines through 1993 then increases in 1994 and 1995. This increase is discussed in the section on chemicals (Table 3).

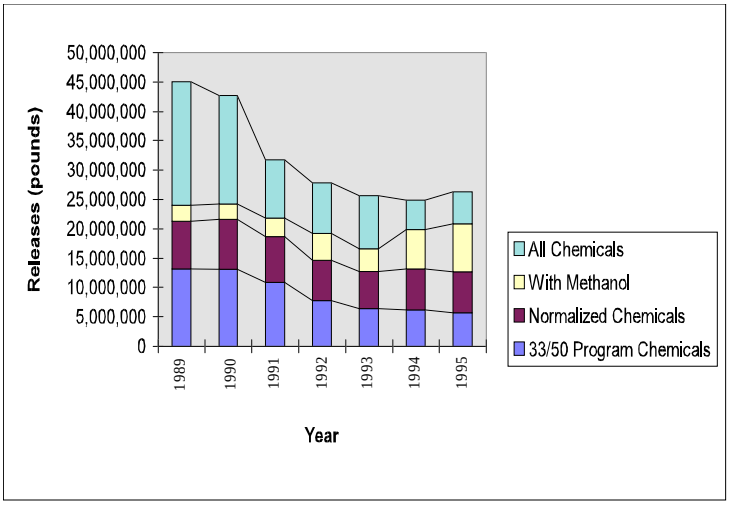


Figure 7
Washington TRI Releases, 1989-1995

Toxics Release Inventory Off-site Transfers, 1995

Transfers reported under the Toxics Release Inventory include those chemicals transferred to public owned treatment works and those chemicals transferred to a facility located geographically or physically separate from the reporting facility. These transfers may be for treatment, energy recovery, recycling or disposal. Total transfers for 1995 were 18.9 million pounds.

Transfers to Publicly Owned Treatment Works (POTW)

In 1995, transfers to publicly owned treatment works were 2.5 million pounds, 13 percent of the total transfers reported under Toxics Release Inventory. These transfers appear to have increased dramatically from the 379,000 pounds reported in 1994. However, the number one chemical reported in 1995 was one of the new chemicals, nitrate compounds.

Nitrate compounds are formed when the compounds nitric acid and ammonium nitrate are dissolved in water. Nitrate compounds were added to the list in 1994 because of adverse human health effects caused by nitrate compounds.

A total of 2.3 million pounds of nitrate compounds was reported transferred to POTWs in Washington State in 1995. SEH America in Vancouver reported transfers of 1.5 million pounds of nitrate compounds and Siemans Power Corporation reported transfers of 723,000 pounds.

Chemicals sent to the sanitary sewer may be treated there by a variety of methods. Chemicals not removed in these processes typically move into surface waters. POTWs typically treat incoming chemicals with bacteria. Biological processes may reduce the quantities of chemicals into less toxic compounds before they eventually enter surface water. It is difficult to determine how much of a chemical in the surface water is from a reporting facility.

Permitted releases are releases that occur within the parameters established by the department to assure that the receiving waters are protected and can sustain beneficial uses (fishable, swimmable, etc.). While the materials identified may be "toxic" in concentrated quantities, when released through a POTW, within permit limits to the environment, the release should not be in quantities that will be toxic and damaging to the receiving waters.

Transfers to Other Off-site Locations

Chemicals reported as transferred to other locations for treatment, storage, disposal, recycling or energy recovery were 16.4 million pounds in 1995, 87 percent of total transfers. Industries reporting the highest transfer amounts are in the "primary and fabricated metals manufacturing" industry categories (Birmingham Steel Corporation Seattle, 8.0 million pounds and Reynolds Metals Co. - Longview 1 million pounds) and transportation equipment manufacturing (Boeing CAG Fabrication Division -Auburn, 675,000 pounds).

A total of 14 facilities each reported transfers of more than 200,000 pounds in 1995.

Metals like copper, lead, and manganese and organic solvents like xylene and toluene are among the chemicals with the greatest amounts being transferred off-site.

Pollution Prevention Act Reporting

One-time Releases

One- time releases were reported at 20,555 pounds in 1995 compared to 6,474 pounds in 1994 and 8,202 pounds in 1993. Boeing Plant 2, Seattle, reported one-time releases of 8,600 pounds of chlorodifluoromethane. Exterior Wood Inc., Washougal, reported one-time releases of 4,908 pounds of arsenic compounds, 2,825 pounds of chromium compounds and 2,469 pounds of copper compounds. One-time releases include those due to remedial or cleanup actions, catastrophic events like floods, and one-time events not associated with normal production processes.

Total waste processed or disposed of by a facility is reported under The Pollution Prevention Act of 1990. These data elements include the amount of chemicals reported under Toxics Release Inventory as generated as waste or recycled and used for energy recovery, or treated both on and off the facility premises (Table 5). Facilities report for the current and prior year and estimate totals for the next two year. Estimates for 1996 and 1997 indicate the total waste processed or disposed of by those facilities required to report under the Toxics Release Inventory in Washington State will remain relatively constant through 1997.

	1994	1995	1996 (projected)	1997 (projected)
Energy Recovery Onsite	9,768,829	12,360,424	12,656,732	12,923,985
Energy Recovery Offsite	746,771	626,429	568,465	554,562
Recycling Onsite	82,550,131	81,077,373	84,094,374	85,117,951
Recycling Offsite	12,624,339	14,279,751	14,166,743	14,642,615
Treated Onsite	152,102,216	138,974,325	142,189,508	134,123,195
Treated Offsite	3,257,366	3,168,386	3,340,961	3,650,386
Total	261,051,646	250,488,683	257,018,779	251,012,694
Quantity Released	24,810,439	27,220,146	27,366,191	26,752,100
Total Waste	285,862,085	277,708,829	284,384,970	277,764,794
One Time Release	6,474	20,555		

Table 5
Pollution Prevention Act Reporting, 1995

"Certification Form" / Alternate Threshold

For reporting year 1995, facilities were permitted to file a "Certification Form" instead of a Form R or Toxics Release Inventory Report if they met the following conditions for that chemical:

1. The facility met the industry category and employee requirements for reporting (Appendix 5);

2. The facility used more than the threshold (10,000 or 25,000 pounds) of a listed chemical, but used less than 1 million pounds;
3. The total annual reportable amount of the chemical released, disposed of, used for energy recovery, recycled or treated (both on and off-site) was less than 500 pounds.

The result of filing a "Certification Form" is:

1. The facility is not classified as a Form R reporter for that chemical. They will not be included as a Toxics Release Inventory reporter by EPA or Ecology for that chemical. If they file only certification forms for all chemicals, they would not be considered a Form R reporter at all.

2. The facility is not subject to pollution prevention planning requirements for that chemical based upon Form R status. They may still be subject to Washington state's pollution prevention planning requirements based on hazardous waste generator status or for other chemicals.

Appendix 4 lists the facilities and chemicals reported on the certification form for 1995. Twenty facilities used the "Certification Form" for all chemicals. Six facilities used certification forms for one or more chemicals but filed additional 9 page Form R reports for other chemicals. Other reporting facilities may have qualified to use the certification form, but chose to file a Form R in order to get credit for their reductions in releases or because they were unaware of the two page form.

[1] *Known or suspected carcinogen under OSHA, 1994 Toxics Release Inventory, Public Data Release, US EPA, Washington, DC, 1996. pp. 73-74.*

[2] The World Almanac and Book of Facts, 1995, Robert Farnighetti, Editor. Funk & Wagnalls, 1994.

[3] 1995 Population Trends for Washington State, October 1995, Produced by the Forecasting Division of the Office of Financial Management, Olympia, Washington.